

**REMARKS**

Claims 1 to 20 are currently pending in this application. All of the claims are rejected. By this amendment, Applicants have amended claims 1 and 12. In view of the above amendments and the following remarks, Applicants respectfully submit that this application is in condition for allowance. Accordingly, reconsideration and a timely notice of allowance are respectfully requested.

**Claim Amendments**

Claims 1 and 12 have been amended for clarity and not for reasons of patentability. No new matter has been added. Full support for the amendments is found in the specification and drawings as filed. Entry of these amendments is respectfully requested.

**Rejections Under 35 U.S.C. §112**

The Examiner rejected claims 1 to 20 under 35 U.S.C. §112 first paragraph. In particular, the Examiner states that the specification, while being enabling for the first polymeric composition (SCC polymer), does not reasonably provide enablement for a second polymeric composition. Applicants respectfully traverse this rejection.

As explained on page 15, line 9 to page 17, line 6 of the specification as filed, Applicants disclose numerous materials that can be used for the second composition. The specification states that the second composition may be non-polymeric, in which case the second composition may comprise, for example, one or more metals (including alloys) or silicon. See page 15, lines 11 to 13. Additionally, the second composition may be polymeric, may be prepared by melt-shaping, and may comprise one or more of the multitude of crystalline and noncrystalline homopolymers and copolymers conventionally used in the preparation of fibers, of which numerous examples are given. See page 15, line 22 to page 16, line 8. The specification also states that second polymeric composition can comprise an electroactive, electrooptical or non-linear optical polymer, for example polyacetylene, polydiacetylene, polypyrrole, polyphenylene vinylene,

polythiophene polyisothianaphthene or polyaniline. See page 16, lines 10 to 13.

In view of the detailed disclosure in the specification, Applicants respectfully submit that one skilled in the art would be sufficiently enabled by the specification to make and use the claimed article, including the second composition. Accordingly, Applicants respectfully request that the rejection of claims 1 to 20 under 35 U.S.C. §112 be withdrawn.

### **Claim Rejections Under 35 U.S.C. §102(b)**

The Examiner rejected claims 1-10 and 20 under 35 U.S.C. §102(b), as being anticipated by JP8-311716A. Applicants respectfully traverse this rejection.

The present invention, according to an embodiment, is specifically directed to an article having a temperature-dependent shape. Independent claim 1 recites a first polymeric composition comprising a crystalline polymer having a peak melting temperature  $T_p$  and an onset of melting temperature  $T_o$  “such that such that  $(T_p - T_o)$  is less than  $(-1.7757e^{-5})x(T_p^3) + (3.339e^{-3})x(T_p^2) - (6.977e^{-2})x(T_p) + k$ , where  $k$  is 21.” Additionally, claims 1 and 12 recite a second component with “the first polymeric composition having a volume expansion between  $T_o$  and  $T_p$  which is greater than the volume expansion of the second composition over the same temperature range, and the first and second components having dimensions and shapes such that the article, in the absence of external restraint, changes shape when it is heated from  $T_o$  to  $T_p$  and when it is cooled from  $T_p$  to  $T_o$ .” Applicants respectfully submit that JP8-311716A fails to teach or suggest these limitations.

The abstract of JP8-311716A is directed to an endothermic and exothermic conjugate fiber absorbing or generating heat by the change of body temperature or outside air temperature. However, the abstract only recites a fiber having thermoplastic, such as polyethylene, with a paraffin wax. The Examiner states that the composition taught in the abstract of JP8-311716A has the same structural identity as claimed. However, Applicants respectfully disagree and submit that the abstract of JP8-311716A does not teach or suggest a crystalline polymer. Therefore, Applicants respectfully

disagree that the polymer suggested in the abstract of JP8-311716A inherently has the claimed peak melting temperatures and onset of melting temperatures.

Additionally, Applicants note that the fiber taught in the abstract of JP8-311716A is coated with a cover of a thermoplastic polymer having a melting point of greater than or equal to 200 °C. Applicants respectfully submit that the thermoplastic cover prevents shape changing during heating and cooling of the inner components. Therefore, Applicants respectfully submit that JP8-311716A fails to teach or suggest an article that “in the absence of external restraint, changes shape when it is heated from  $T_o$  to  $T_p$  and when it is cooled from  $T_p$  to  $T_o$ .”

Accordingly, Applicants respectfully submit that claim 1 is patentable over JP8-311716A. Claims 2 to 10 and 20 depend from claim 1 and by definition contain all of the limitations of claim 1. Therefore, Applicants respectfully submit that claims 2 to 10 and 20 are patentable over JP8-311716A for the reasons given above for claim 1 as well as because of the additional limitations contained therein.

For example, claim 6 recites that “the crystalline polymer is a side chain crystalline (SCC) polymer.” Claim 8 recites that “a fiber which is relatively straight at temperatures above  $T_p$  and becomes curved when cooled from a temperature above  $T_p$  to a temperature below  $T_o$ ”. Applicants respectfully submit that JP8-311716A fails to teach or suggest these limitations.

Accordingly, Applicants respectfully request that the rejection of claims 1-10 and 20 under 35 U.S.C. §102(b) as being anticipated by JP8-311716A be withdrawn.

#### **Claim Rejections Under 35 U.S.C. §102(e)**

The Examiner rejected claims 1-20 under 35 U.S.C. §102(e), as being anticipated by Clark et al. (U.S. Patent No. 6,723,669). Applicants respectfully traverse this rejection.

As explained above, the present invention, according to an embodiment, is specifically directed to an article having a temperature dependent shape. The changeable shape of the article imparts important advantages thereto. For example, as explained on

page 7, line 26 to page 8, line 12, the fibers can be created so that they crimp as the temperature decreases, thereby expanding the structure the fibers are integrated in to increase the thermal insulation properties of the structure.

Independent claims 1 and 12 recites a first polymeric composition comprising a crystalline polymer having a peak melting temperature  $T_p$  and an onset of melting temperature  $T_o$  with “the first polymeric composition having a volume expansion between  $T_o$  and  $T_p$  which is greater than the volume expansion of the second composition over the same temperature range, and the first and second components having dimensions and shapes such that the article, in the absence of external restraint, changes shape when it is heated from  $T_o$  to  $T_p$  and when it is cooled from  $T_p$  to  $T_o$ .” Applicants respectfully submit that Clark et al. fail to teach or suggest these limitations.

Clark et al. is directed to multicomponent fine fiber webs and multilayer laminates thereof. As explained in col. 3, lines 11 to 15, multicomponent fibers are made of at least two polymer streams that are extruded to form a unitary fiber. While Clark et al. teach many different compositions of fibers and many uses therefore, Clark et al. do not teach articles having a temperature dependent shape. Therefore, Applicants respectfully disagree with the Examiner’s statement that the fibers of Clark et al. inherently teach the claimed characteristics, because they are identical in structure.

Applicants respectfully submit that Clark et al. teach many different structures, but not the claimed structure. Moreover, Applicants respectfully submit that Clark et al. teach away from the present invention by teaching articles with permanent three-dimensional shapes. See col. 15, lines 19 to 46.

Thus, Applicants respectfully submit that Clark et al. fail to teach or suggest the limitations of claim 1 and 12 of “the first polymeric composition having a volume expansion between  $T_o$  and  $T_p$  which is greater than the volume expansion of the second composition over the same temperature range, and the first and second components having dimensions and shapes such that the article, in the absence of external restraint, changes shape when it is heated from  $T_o$  to  $T_p$  and when it is cooled from  $T_p$  to  $T_o$ .” Accordingly, Applicants respectfully submit that claims 1 and 12 are patentable over

Clark et al.

Claims 2 to 11 and 13 to 20 depend on claims 1 and 12 respectively and by definition contain all of the limitations of claims 1 and 12. Accordingly, Applicants respectfully submit that claims 2 to 11 and 13 to 20 are patentable over Clark et al. for the reasons given above for claims 1 and 12 and because of the additional limitations contained therein.

For example, claim 8 recites that the article “is a fiber which is relatively straight at temperatures above  $T_p$  and becomes curved when cooled from a temperature above  $T_p$  to a temperature below  $T_o$ .” Additionally, claim 15 recites that “wherein the fibers are relatively straight at temperatures above  $T_p$  and becomes curved when cooled from a temperature above  $T_p$  to a temperature below  $T_o$ .” Applicants respectfully submit that Clark et al. fail to teach or suggest these limitations.

Therefore, Applicants respectfully request that the rejection of claims 1 to 20 under 35 U.S.C. §102(e) as being anticipated by Clark et al. be withdrawn.

### CONCLUSION

In view of the above amendments and remarks, Applicants respectfully submit that this application is in condition for allowance. Accordingly, reconsideration and a timely indication of allowance are respectfully requested.

If the Examiner believes a telephone conference would aid in the prosecution of this application, the Examiner is invited to contact the undersigned at the below-listed telephone number.

A fee of \$510 is believed due with this Response for a three month extension of time. The Commissioner is authorized to charge this fee and any other fees due with this Response to Deposit Account No. 19-2090.

Respectfully submitted,

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